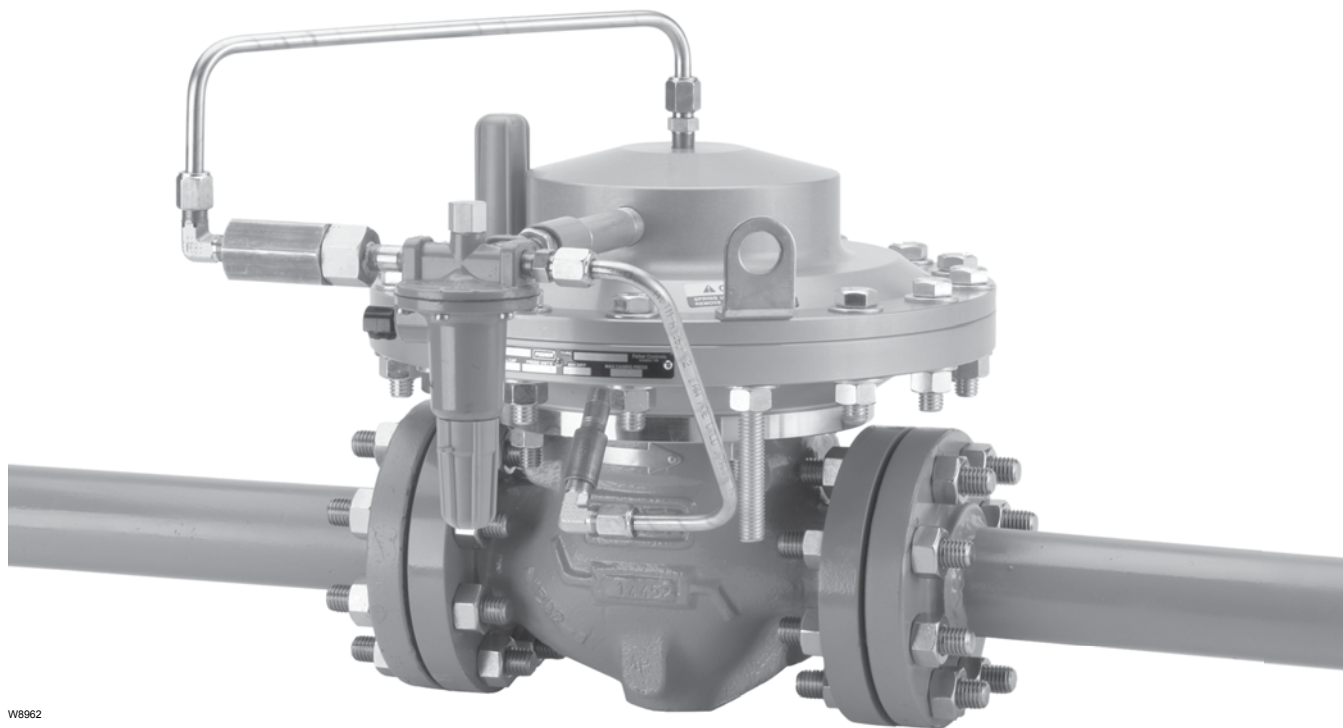


January 2015

# Type EZL Pressure Reducing Regulator for Low Pressure Applications



W8962

*Figure 1. Type EZL Pressure Reducing Regulator*

## Introduction

### Scope of Manual

This manual provides installation, startup, maintenance and parts ordering information for the Type EZL pressure reducing regulator. Information on other equipment used with this regulator is found in separate manuals.

### Product Description

Type EZL regulators are accurate pilot-operated, pressure balanced and soft seated regulators. They are designed for use in natural gas distribution applications such as district regulating stations and commercial/industrial meter sets. They provide low differential, smooth, reliable operation, tight shutoff and long life.

# Type EZL

## Specifications

The Specifications section lists the specifications for Type EZL pressure reducing regulator. Factory specifications for specific regulator constructions are stamped on the nameplate fastened to either the main actuator or the pilot spring case.

<div>Available Configuration</div> <div>Type EZL: Pilot-operated pressure reducing regulator for low to high outlet pressure</div> <div>Body Sizes, End Connection Styles and Pressure Ratings<sup>(1)</sup></div> <div>See Table 1</div> <div>Maximum Pressures<sup>(1)</sup></div> <div>Inlet and Outlet (Design): 285 psig / 19.7 bar</div> <div>Emergency (Design Casing): 285 psig / 19.7 bar</div> <div>Operating Differential: 285 psid / 19.7 bar d</div> <div>Outlet Pressure Ranges</div> <div>See Table 2</div>	<div>Minimum Differential Pressure<sup>(1)</sup></div> <table><tr><th rowspan="2">TRIM, PERCENT OF CAPACITY</th><th colspan="2">MINIMUM DIFFERENTIAL FOR FULL STROKE, psid / bar d</th></tr><tr><th>2 in. / DN 50</th><th>3 and 4 in. / DN 80 and 100</th></tr><tr><td>100</td><td>2.9 / 0.204</td><td>2.9 / 0.204</td></tr><tr><td>80</td><td>2.9 / 0.204</td><td>3.1 / 0.214</td></tr><tr><td>50</td><td>3.0 / 0.207</td><td>3.2 / 0.221</td></tr><tr><td>30</td><td>3.4 / 0.234</td><td>3.5 / 0.241</td></tr></table> <div>Temperature Capabilities<sup>(1)</sup></div> <div>Standard Elastomers:</div> <div>-20 to 180°F / -29 to 82°C</div> <div>High-Temperature Elastomers:</div> <div>0 to 180°F / -18 to 82°C</div> <div>Options</div> <div><ul style="list-style-type: none"><li>• Prepiped Pilot Supply</li><li>• Travel Indicator</li><li>• Integral Type OS2 Slam-shut Device</li></ul></div>	TRIM, PERCENT OF CAPACITY	MINIMUM DIFFERENTIAL FOR FULL STROKE, psid / bar d		2 in. / DN 50	3 and 4 in. / DN 80 and 100	100	2.9 / 0.204	2.9 / 0.204	80	2.9 / 0.204	3.1 / 0.214	50	3.0 / 0.207	3.2 / 0.221	30	3.4 / 0.234	3.5 / 0.241
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1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

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**Table 1. Main Valve Body Sizes, End Connection Styles and Body Ratings**

MAIN VALVE BODY SIZE	MAIN VALVE BODY MATERIAL	END CONNECTION STYLES	STRUCTURAL DESIGN RATING <sup>(1)</sup>
2, 3 and 4 in. / DN 50, 80 and 100	WCC Steel	NPT <sup>(2)</sup> or SWE <sup>(2)</sup>	1500 psig / 103 bar
		CL150 RF	290 psig / 20.0 bar
		CL300 RF	750 psig / 51.7 bar
		CL600 RF or BWE	1500 psig / 103 bar
	Cast Iron	NPT <sup>(2)</sup>	400 psig / 27.6 bar
		CL125B FF	200 psig / 13.8 bar
		CL250B RF	500 psig / 34.5 bar

1. Structural Design Rating is the rating for the main valve body. The Type EZL complete assembly is limited to 285 psig / 19.7 bar.

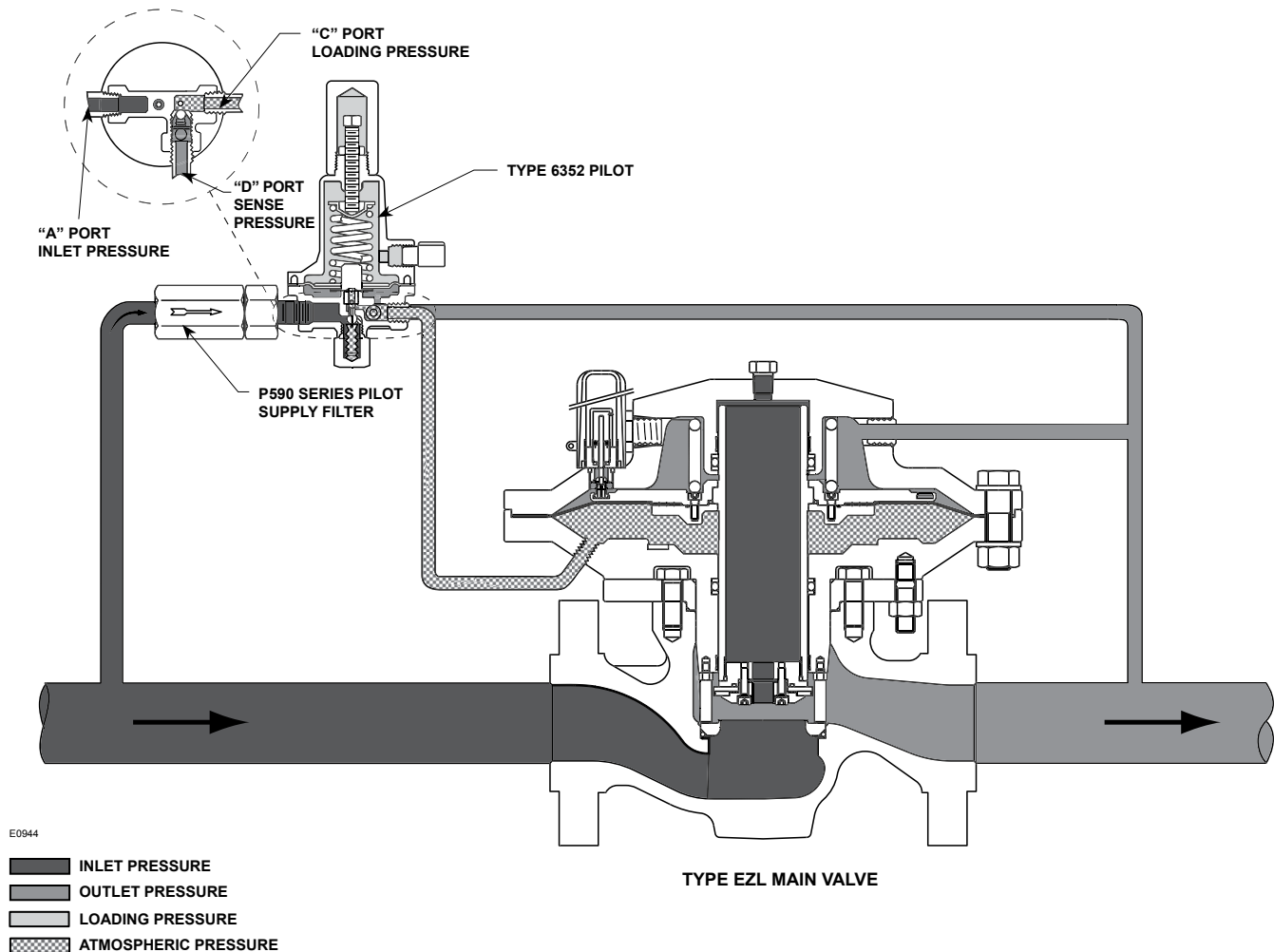
2. Available only on 2 in. / DN 50 body

**Table 2. Outlet Pressure Ranges**

PILOT TYPE	OUTLET CONTROL PRESSURE RANGE		SPRING COLOR	SPRING PART NUMBER
	psig	bar		
6352	2 to 10	0.14 to 0.69	Black	14A9673X012
6353	3 to 40	0.21 to 2.8	Yellow	1E392527022
	35 to 125	2.4 to 8.6	Red	1K748527202
6354L <sup>(1)</sup>	85 to 200	5.9 to 13.8	Blue	1L346127412
6354M <sup>(2)</sup>	175 to 220	12.1 to 15.2	Blue	1L346127412
6354H	200 to 285	13.8 to 19.7	Green	15A9258X012
61L	0.25 to 2	0.02 to 0.14	Red	1B886327022
	1 to 5	0.07 to 0.34	Yellow	1J857827022
	2 to 10	0.14 to 0.69	Blue	1B886427022
	5 to 15	0.34 to 1.0	Brown	1J857927142
	10 to 20	0.69 to 1.4	Green	1B886527022
61HP	15 to 45	1.0 to 3.1	Yellow	1E392527022
	35 to 100	2.4 to 6.9	Blue	1D387227022
	100 to 285	6.9 to 19.7	Red	1D465127142
161M	5 to 15	0.34 to 1.0	Yellow	1E392527022
	10 to 125	0.69 to 8.6	Red	1K748527202
	120 to 300	8.3 to 20.7	Green	15A9258X012
161EBM	5 to 15	0.34 to 1.0	White	17B1260X012
	10 to 40	0.69 to 2.8	Yellow	17B1262X012
	30 to 75	2.1 to 5.2	Black	17B1259X012
	70 to 140	4.8 to 9.6	Green	17B1261X012
	130 to 200	9.0 to 13.8	Blue	17B1263X012
	200 to 350	13.8 to 24.1	Red	17B1264X012

1. Without diaphragm limiter.

2. With diaphragm limiter.



**Figure 2.** Type EZL with Type 6352 Pilot and Type P590 Pilot Supply Filter Operational Schematic

## Principle of Operation

### Single-Pilot Regulator

The pilot-operated Type EZL (Figure 2 or 3) uses inlet pressure as the operating medium, which is reduced through pilot operation to load the actuator diaphragm. Outlet or downstream pressure opposes loading pressure in the actuator and also opposes the pilot control spring.

When outlet pressure drops below the setting of the pilot control spring, pilot control spring force on the pilot diaphragm thus opens the pilot valve plug, providing additional loading pressure to the actuator diaphragm. This diaphragm loading pressure opens the main valve plug, supplying the required flow to the downstream system. Any excess loading pressure on

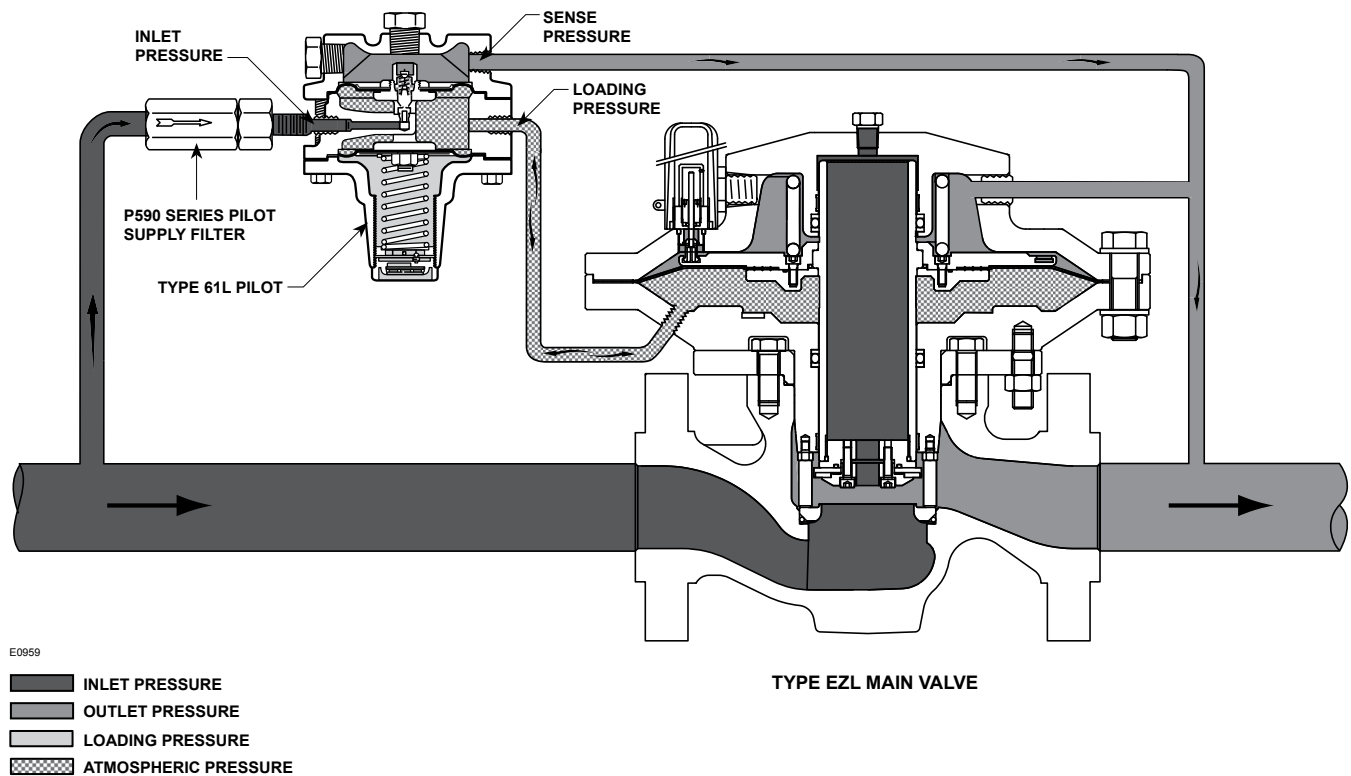
the actuator diaphragm escapes downstream through the bleed restriction in the pilot.

When the gas demand in the downstream system has been satisfied, the outlet pressure increases. The increased pressure is transmitted through the downstream control line and acts on the pilot diaphragm. This pressure exceeds the pilot spring setting and moves the diaphragm, closing the orifice. The loading pressure acting on the main diaphragm bleeds to the downstream system through a bleed restriction in the pilot.

### Adjustment

The adjustment of the regulator is performed by means of the pilot adjusting screw, which varies the compression of the control spring. Adjustment

# Type EZL



**Figure 3.** Type EZL with Type 61L Pilot and Type P590 Pilot Supply Filter Operational Schematic

is performed while the regulator is in operation with the aid of a pressure gauge to monitor downstream pressure. The shutoff valve downstream of the regulator must not be completely closed; it is necessary that a small quantity of gas flows downstream to allow the outlet side to vent, when it is necessary to lower the pressure.

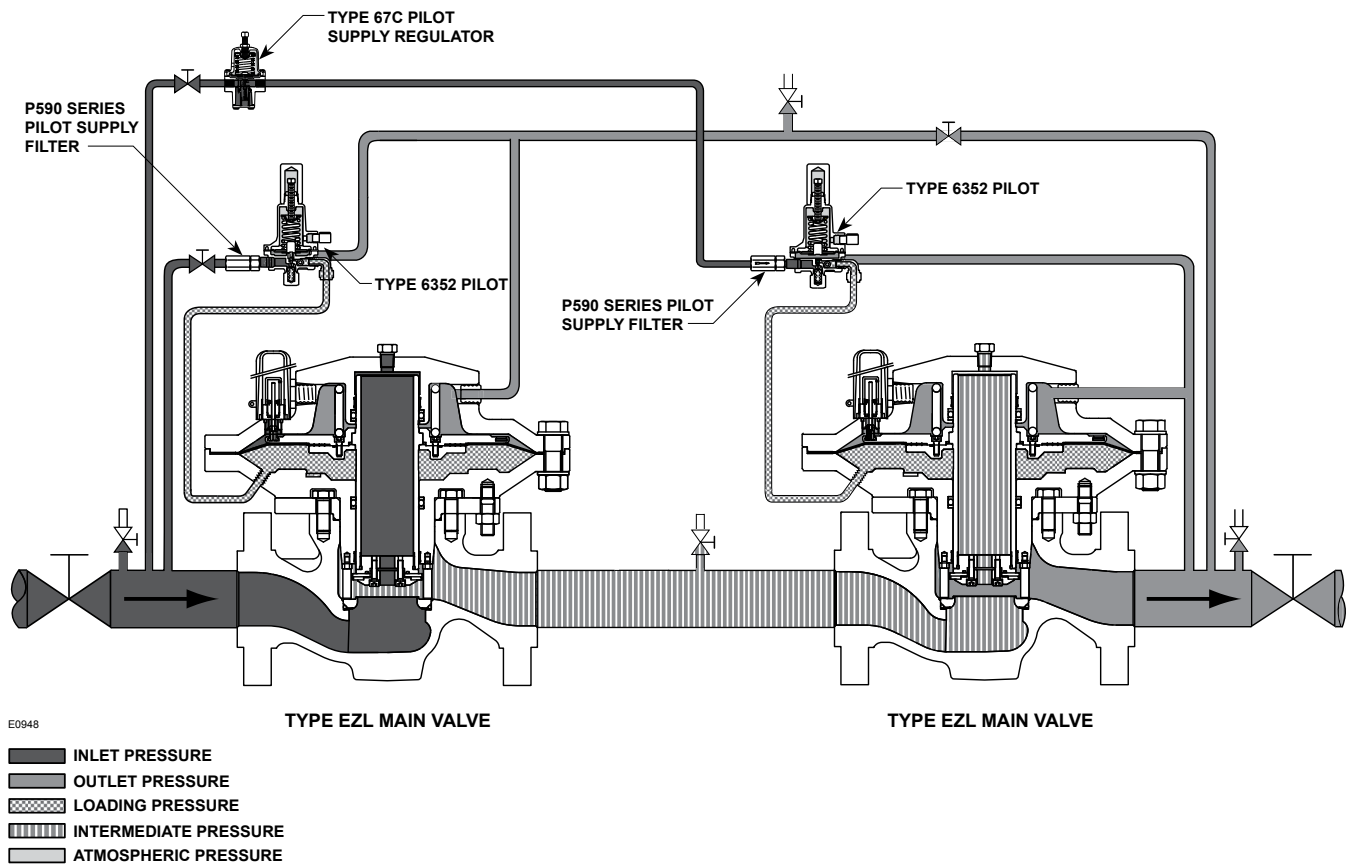
## Monitoring Systems

Monitoring regulation is overpressure protection by containment, therefore, there is no relief valve to vent to the atmosphere. When the working regulator fails to control the pressure, a monitor regulator installed in series, which has been sensing the downstream and control pressure, goes into operation to maintain the downstream pressure at a slightly higher than normal pressure. During an overpressure situation, monitoring keeps the customer on line. Also, testing is relatively easy and safe. To perform a periodic test on a monitoring regulator, increase the outlet set pressure of the working regulator and watch the outlet pressure to determine if the monitoring regulator takes over at the appropriate outlet pressure.

## Wide-Open Monitoring Systems (Figure 4)

There are two types of wide-open monitoring systems: upstream and downstream. The difference between upstream and downstream monitoring is that the functions of the regulators are reversed. Systems can be changed from upstream to downstream monitoring and vice-versa, by simply reversing the setpoints of the two regulators. The decision to use either an upstream or downstream monitoring system is largely a matter of personal preference or company policy.

In normal operation of a wide-open configuration, the working regulator controls the system's outlet pressure. With a higher outlet pressure setting, the monitor regulator senses a pressure lower than its setpoint and tries to increase outlet pressure by going wide-open. If the working regulator fails, the monitoring regulator assumes control and holds the outlet pressure at its outlet pressure setting.



*Figure 4. Wide-Open Monitoring System Operational Schematic*

## Working Monitoring Regulators (Figure 5)

In a working monitoring system, the upstream regulator requires two pilots and it is always the monitoring regulator. The additional pilot permits the monitoring regulator to act as a series regulator to control an intermediate pressure during normal operation. In this way, both units are always operating and can be easily checked for proper operation.

In normal operation, the working regulator controls the outlet pressure of the system. The monitoring regulator's working pilot controls the intermediate pressure and the monitoring pilot senses the system's outlet pressure. If the working regulator fails, the monitoring pilot will sense the increase in outlet pressure and take control.

### Note

**The working regulator must be rated for the maximum allowable operating pressure of the system because this will**

**be its inlet pressure if the monitoring regulator fails. Also, the outlet pressure rating of the monitoring pilot and any other components that are exposed to the intermediate pressure must be rated for full inlet pressure.**

Working monitor installations require a Type EZL main valve with a working pilot and a monitoring pilot for the upstream regulator and a Type EZL with the appropriate pilot for the downstream regulator.

## Adjustment

Adjusting the monitor regulator is similar to adjusting the main regulator. Monitor setpoints are set slightly higher than the main regulator. However, the value of this difference cannot be determined in advance, as it depends on the particular characteristics of each application.

# Type EZL

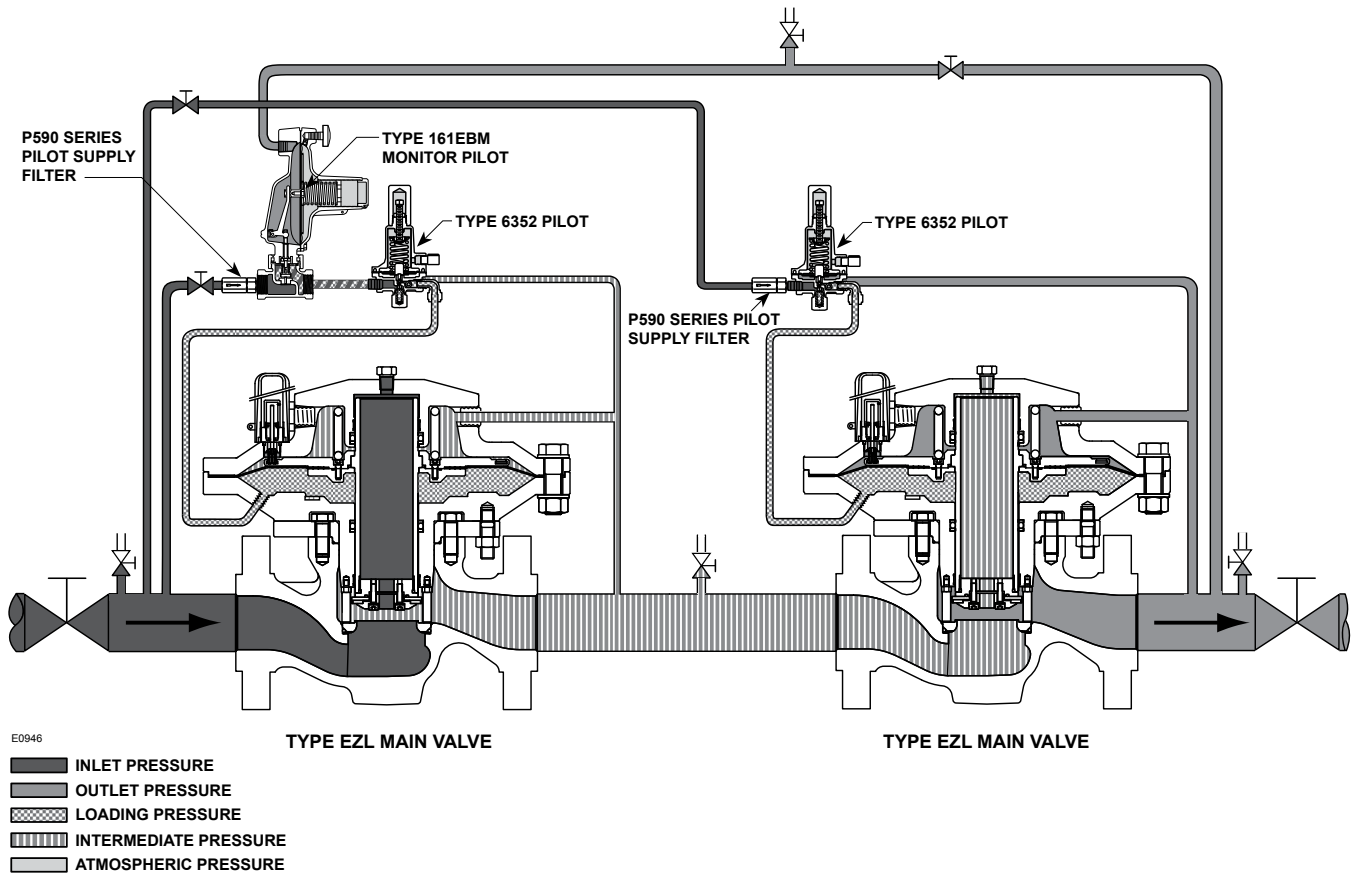


Figure 5. Working Monitoring System Operational Schematic

## Installation



### WARNING

Personal injury or equipment damage, due to bursting of pressure-containing parts may result if this regulator is overpressured or is installed where service conditions could exceed the limits given in the Specification section and on the appropriate nameplate or where conditions exceed any rating of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices to prevent service conditions from exceeding those limits. Also, be sure the installation is in compliance with all applicable codes and regulations.

Additionally, physical damage to the regulator could break the pilot off the main valve, causing personal injury and

property damage due to bursting of pressure-containing parts. To avoid such injury and damage, install the regulator in a safe location.

## All Installations

A Type EZL regulator bleeds no gas to atmosphere during normal operation, thus making the regulator suitable for installation in pits and other enclosed locations without elaborate venting systems. This regulator also can be installed in pits subject to flooding by venting the pilot spring case above the expected flood level so that the pilot setting can be referenced to atmospheric pressure.

1. Only personnel qualified through training and experience should install, operate and maintain a regulator. Before installation, make sure that there is no damage to or debris in the regulator. Also, make sure that all tubing and piping are clean and unobstructed.

## Note

**When upgrading Fisher® control valves, such as Types ET, ED and ES make sure the body is in the flow up direction.**

2. Install the regulator so that the flow arrow on the main valve matches the flow direction of process fluid through the regulator.
3. Apply pipe comb to the external pipeline threads before installing a regulator with threaded end connections. Use gaskets between pipeline and regulator flanges when installing a regulator with flanged end connections. When installing butt weld end connections, remove trim before welding and make sure to use approved welding practices. Use approved piping procedures when installing the regulator.



## WARNING

**A regulator may vent some gas to the atmosphere. In hazardous or flammable gas service, vented gas may accumulate, causing personal injury, death or property damage due to bursting of pressure-retaining parts. Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous location. The vent line or stack opening must be protected against condensation or clogging.**

4. Pilots have a 1/4 in. NPT vent connection in the spring case. To remotely vent gas from the spring case, remove the screened vent and connect 1/4 in. / 6.4 mm piping or tubing to the spring case connection. The piping or tubing should vent to a safe location, have as few elbows as possible and have a screened vent on its exhaust. Install the regulator and any remote vent piping or tubing so that the vent is protected from condensation, freezing or substances that may clog it.



## CAUTION

**To avoid freezeup because of pressure drop and moisture in the gas, use anti-freeze practices, such as heating the supply gas or adding a de-icing agent to the supply gas.**

5. Run a 3/8 in. / 9.5 mm outer diameter or larger pilot supply line from the upstream pipeline to the filter inlet as shown in Figure 3, bushing the line down to fit the 1/4 in. threaded NPT filter connection. Do not make the upstream pipeline connection in a turbulent area, such as near a nipple, swage or elbow. If the maximum pilot inlet pressure could exceed the pilot rating, install a separate reducing regulator in the pilot supply line. Install a hand valve in the pilot supply line and provide vent valves to properly isolate and relieve the pressure from the regulator.
6. Attach a 1/2 in. / 12 mm piping or tubing downstream control line to the 1/2 in. threaded NPT control line connection on the actuator casings. Connect the other end of the control line to the pipeline downstream of the regulator. Do not attach the control line near any elbow, swage, block valve or any other location that might cause turbulence. Install a full port ball valve in the control line to shutoff the control pressure when using the bypass.
7. If a quick acting solenoid is to be installed downstream of a regulator, the regulator and solenoid should be located as far apart as practical. This will maximize the gas piping volume between the regulator and solenoid and improve the regulator response to quick changing flow rates.
8. Consult the appropriate instruction manual for installation of an optional pneumatic or electric remote control drive unit. For optional remote pneumatic loading of a 6350 or 61 Series pilot, make the loading piping connections to the 1/4 in. NPT vent connection.

## Wide-Open Monitor Regulator (Figure 4)

1. Follow the procedures in the All Installations section and then continue with step 2 of this section.
2. Connect the control line of the wide-open monitoring regulator to the downstream piping near the working regulator control line connection. During normal operation, the wide-open regulator stands wide-open with the pressure reduction being taken across the working regulator. Only in case of working regulator failure does the wide-open monitoring regulator take control at its slightly higher setting.

Regardless of which regulator is used as the monitor, it should be equipped with a pilot supply regulator set to limit the pilot supply pressure to 10 to 15 psig / 0.69 to 1.0 bar above control pressure. Since the

# Type EZL

pilot on the monitoring regulator is wide-open during normal operation, the pilot supply regulator is used to prevent differential pressure relief valve chatter on the monitoring regulator pilot.

## Working Monitor Regulator (Figure 5)

1. Follow the procedure in the All Installations section and then continue with step 2 of this section.
2. Attach 3/8 in. / 9.5 mm tubing (for Types 161M and 161EBM) downstream control line to the control line (sense) connection on the pilot. Connect the other end of the control line to the pipeline downstream of the downstream working regulator. Do not attach the control line near any elbow, swage, block valve or any other location that might cause turbulence.
3. Apply pilot sense pressure by connecting the outlet of the monitor pilot to the inlet of the working monitor pilot.

## Startup and Adjustment

### Pre-startup Considerations

Each regulator is factory-set for the outlet pressure specified on the order. If no setting was specified, outlet pressure was factory-set at the mid-range of the pilot control spring. Before beginning the startup procedure in this section, make sure the following conditions are in effect:

- Block valves isolate the regulator
- Vent valves are closed
- A bypass, if any, is in operation

In all cases, check the control spring setting to make sure it is correct for the application.



### CAUTION

**Be sure to slowly introduce pressure into the system to prevent downstream overpressure due to potential rapid pressure increase. Pressure gauges should always be used to monitor downstream pressure during startup. Procedures used in putting this**

**regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.**

## Startup

1. Make sure all block valves, vent valves and control line valve(s) are closed.
2. Back out the pilot adjusting screw(s).
3. **Slowly open** the valves in the following order:
  - a. Pilot supply and control line valve(s), if used.
  - b. Inlet block valves.
4. Crack open the outlet block valve or bypass valve to allow minimum flow.
5. **For a single regulator**, set the pilot to the desired outlet (control) pressure according to the Pilot Adjustment procedure.

### **For a wide-open downstream monitor**

**installation**, adjust the upstream working pilot until intermediate pressure is higher than the desired setpoint of the monitor pilot. Adjust the downstream monitoring pilot to the desired monitoring takeover pressure. Reduce the upstream pilot to the normal outlet pressure setting.

**For a wide-open upstream monitor installation**, adjust the downstream working pilot to a setpoint higher than the setpoint of the monitor pilot.

Adjust the downstream monitoring pilot to the desired monitoring takeover pressure. Reduce the upstream pilot to the normal outlet pressure setting.

**For a working monitor installation**, adjust the setpoint of the upstream monitor pilot to the desired maximum pressure. Adjust the upstream working pilot to the desired intermediate pressure setting. Adjust the downstream pilot to a pressure setting slightly above the upstream monitor pilot pressure setting. Adjust the upstream monitor pilot to its desired setpoint. Establish final desired downstream pressure by adjusting the downstream working regulator pilot.

6. After adjusting the pilot(s) to the desired pressure setting(s), slowly open the downstream block valve wide-open.
7. Close the bypass valve, if used.

## Pilot Adjustment

Remove closing cap, if necessary. Loosen the locknut. Turn the adjusting screw into the spring case to increase the downstream pressure. Turn the adjusting screw out of the spring case to decrease the downstream pressure. Use a pressure gauge to monitor the outlet pressure until the desired pressure is reached. When the required downstream pressure is maintained for several minutes, tighten the locknut to lock the adjusting screw in position. Replace the pilot closing cap, if necessary.

## Shutdown

### CAUTION

**If the pilot bleed control line pressure is shutdown first, the downstream system may be subjected to full inlet pressure.**

1. If the pilot setting must be disturbed, be sure to keep some tension on the spring. This will prevent trapping inlet pressure during blow down.
2. Slowly close the valves in the following order:
  - a. Inlet block valve
  - b. Outlet block valve
  - c. Control line valve(s), if used.
3. Open the vent valves to depressurize the system.

## Maintenance

The regulator parts are subject to normal wear and must be inspected periodically and replaced as necessary. The frequency of inspection and replacement depends on the severity of service conditions and on applicable federal, state and local codes and regulations.

### WARNING

**To avoid personal injury or property damage from sudden release of pressure, isolate the regulator from the pressure system and release all pressure from the pilot and main valve before performing maintenance operations.**

### CAUTION

**When disassembling the upper and lower actuator, always remove the long cap screws (key 39) last to allow spring tension force to be released in a slow and controlled manner.**

**Use proper lifting techniques, when lifting the upper and lower actuator casings (keys 11 and 5) off the Type EZL body (key 1). The 2 in. / DN 50 actuator assembly weighs more than 40 lbs / 18 kg.**

## Type EZL (Figure 7)

### Seat Maintenance

1. Make a mark on the lower actuator casing (key 5), intermediate flange (key 25) and body (key 1) to indicate proper alignment.
2. Remove stud nuts (key 26).

### CAUTION

**Use proper care in moving actuator to ensure no damage occurs to the pins or actuator casings.**

3. Carefully lift the actuator assembly (keys 11 and 5) off the body (key 1).
4. Remove O-ring (key 34) from lower actuator casing (key 5). Inspect the O-ring for damage or wear and replace if necessary. Lightly lubricate O-ring before placing on lower actuator casing (key 5).
5. Remove the hex socket cap screws (key 33) and spring lock washers (key 32). Lift off the disk holder assembly (key 30) and disk retainer (key 31).
6. Remove the O-ring (key 29). Inspect for damage or wear and replace if necessary. Lightly lubricate O-ring before placing in the sleeve adaptor (key 27).
- 7a. On the 2 and 3 in. / DN 50 and 80 sizes remove the seat ring (key 2), spring washer (key 72) and O-ring (key 34) (see Figure 7, Detail A.2). Inspect the O-ring for damage or wear, replace if necessary.

**Table 3. Torque Specifications**

TORQUE SPECIFICATIONS, FT-LBS / N•m						
Body Size	Indicator Fitting (key 56) or Plug (key 38)	Stud Nuts (key 26)	Socket Head Cap Screws (key 16) <sup>(1)(2)</sup>	Cap Screws (keys 21 and 39)	Cap Screws (key 6)	Socket Head Cap Screws (key 33) <sup>(1)</sup>
2 in. / DN 50	10 to 15 / 15 to 20	45 to 50 / 60 to 70	55 to 60 / 75 to 80	35 to 45 / 50 to 60	50 to 60 / 70 to 80	55 to 60 / 75 to 80
3 and 4 in. / DN 80 and 100	10 to 15 / 15 to 20	80 to 95 / 110 to 130	90 to 100 / 120 to 135	31 to 34 / 42 to 46	70 to 95 / 95 to 130	80 to 90 / 110 to 120

1. Socket head cap screw (keys 16 and 33) torque specifications are given in in-lbs.  
2. Apply torque to each screw in star pattern, 5 complete rounds.

- 7b. On the 4 in. / DN 100 size remove the intermediate flange (key 25), seat ring (key 2) and O-ring (key 75) (see Figure 7, Detail A.2). The seat ring (key 2) can be moved out of the way and the O-ring (key 75) can be removed without removing the intermediate flange (key 25). Inspect the O-ring for damage or wear, replace if necessary.

### Note

**If also inspecting the intermediate flange O-ring, go to step 4 in the Intermediate Flange O-ring Maintenance section below.**

- 8a. For the 2 and 3 in. / DN 50 and 80 sizes reinstall the spring washer (key 72) with the inside edge pointing up. Lightly lubricate O-ring (key 34) before placing on top of the spring washer (key 72) in the body (key 1).
- 8b. For the 4 in. / DN 100 size lightly lubricate the O-ring (key 75) and place it in the body (key 1).
9. Set the seat ring (key 2) back in the body (key 1) with the curved side down and the seat edge up.
10. Place the disk holder assembly (key 30) and disk retainer (key 31) on the sleeve adaptor (key 27).
11. Insert the spring lock washers (key 32) and hex socket cap screws (key 33) and tighten. See Torque Specification table for proper torque.
12. Lubricate surface between lower casing and intermediate flange. Carefully lift the upper actuator casing and lower actuator casing assembly (keys 11 and 5) and place on the body (key 1). Secure with stud nuts (key 26). See Torque Specification table for proper torque.

## Intermediate Flange O-ring Maintenance

1. Make a mark on the lower actuator casing (key 5), intermediate flange (key 25) and body (key 1) to indicate proper alignment.
2. Remove stud nuts (key 26).
3. Carefully lift the upper actuator casing and lower actuator casing assembly (keys 11 and 5) off the body (key 1).
4. Remove cap screws (key 6).
5. Lift off intermediate flange (key 25).
6. Remove O-ring (key 7). Inspect the O-ring for damage or wear and replace if necessary. Lightly lubricate O-ring before placing in the body (key 1).

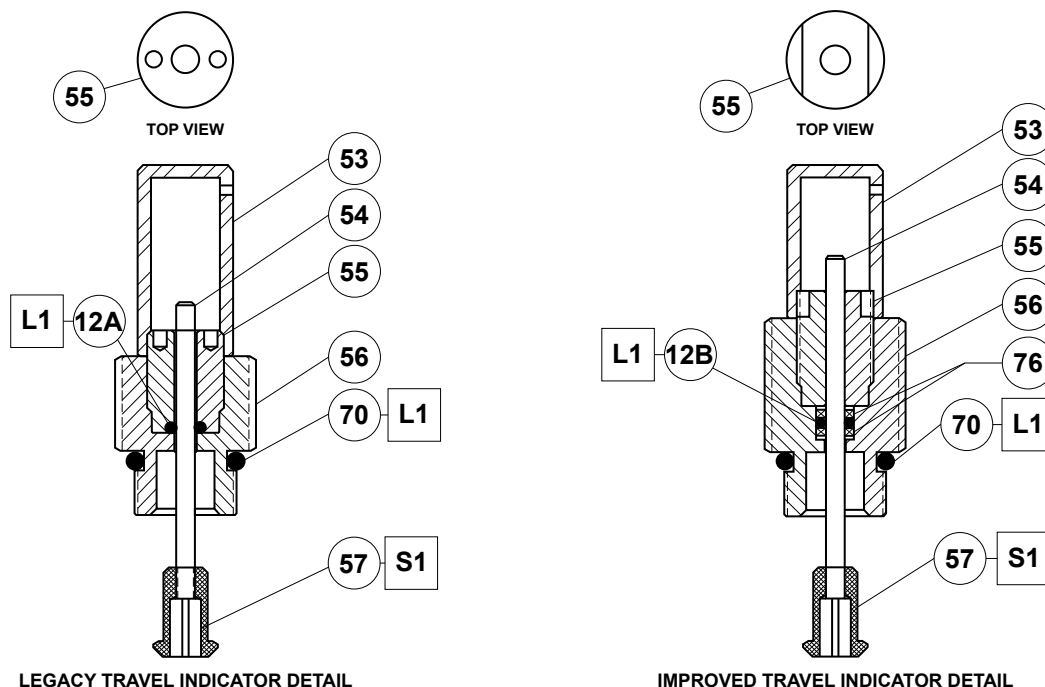
### Note

**If performing Seat Maintenance in conjunction with Intermediate Flange O-ring, return to step 7 of the Intermediate Flange O-ring Maintenance section.**

7. Replace the intermediate flange (key 25), make sure to position the stud bolt (key 24) holes on the outsides of the body (key 1). Secure with cap screws (key 6). See Torque Specification table for proper torque.
8. Lubricate the surface between the lower casing and the intermediate flange. Reinstall actuator assembly to body.

## Actuator Assembly Maintenance

1. Make a mark on the upper actuator casing (key 11), lower actuator casing (key 5), intermediate flange (key 25) and body (key 1) to indicate proper alignment.
2. Remove travel indicator assembly, if present, by loosening the travel indicator fitting (key 56) and lifting out the indicator assembly. Refer to Travel Indicator Maintenance section for maintenance procedure.
3. Remove cap screws (key 21), washers (key 22) and hex nuts (key 23). Remove all the short cap screws first, then evenly remove the two long cap screws (key 39) and brackets (key 35). Take care to balance the upper actuator casing while removing the spring tension. Carefully lift the upper actuator casing (key 11) off the lower actuator casing (key 5). Remove spring (key 13).
4. Remove the hex socket cap screws (key 16). Lift off the diaphragm (key 20) and the inlet plate (key 18). Remove O-rings (keys 15 and 17). Inspect the diaphragm and O-rings for damage or wear and replace if necessary.
5. Inspect the upper actuator casing (key 11), O-ring (key 9), anti-friction split rings (key 8) and anti-friction ring (key 4) for damage or wear. If damaged, remove the O-ring and split rings and replace with new parts. Lightly lubricate the O-ring and split rings. Place the split rings in the body first, then slide the O-ring between the split rings.
6. Remove hex nuts (key 26) from the stud bolts (key 24). Lift off the lower actuator casing (key 5). Remove the hex socket cap screws (key 33) and spring lock washers (key 32). Lift off the disk holder assembly (key 30) and disk retainer (key 31).
7. Slide the sleeve (key 14) out of the lower actuator casing (key 5) and slide the outlet plate (key 19) off of the sleeve. Check the sleeve for scratches, burrs or other damage and replace if necessary.
8. Inspect the lower actuator casing (key 5), O-ring (key 9), anti-friction split rings (key 8) and anti-friction ring (key 4) for damage or wear. If damaged, remove the O-ring and split rings and replace with new parts. Lightly lubricate the O-ring and split rings. Place the split rings in the body first, then slide the O-ring between the split rings.
9. Slide the outlet plate (key 19) onto the sleeve (key 14) and slide the sleeve into the lower actuator casing (key 5). Place the disk holder (key 30) and disk retainer (key 31) on the sleeve adaptor (key 27). Insert the spring lock washers (key 32) and hex socket cap screws (key 33) and tighten. See Torque Specification table for proper torque. If seat was removed, make sure to reinstall.
10. Lightly lubricate the O-rings (keys 15 and 17) and the inner and outer diaphragm (key 20) edges. Make sure O-rings (keys 15 and 17) are correctly positioned. Place the inlet plate (key 18) and the diaphragm (key 20) on the sleeve (key 14). Insert and tighten the hex socket cap screws (key 16). See Torque Specification table for proper torque.
11. Lubricate surface between lower casing and intermediate flange. Carefully lift the lower actuator casing assembly (key 5) and place on the body (key 1). Take care to match up the alignment marks. Secure with stud bolts and nuts (keys 24 and 26). See Torque Specification table for proper torque.
12. Lightly lubricate the spring (key 13) and place on the inlet plate (key 18).
13. Carefully place the upper actuator casing (key 11) on the lower actuator casing (key 5). Take care to match up the alignment marks. Insert the two long cap screws (key 39) and brackets (key 35) 180° apart and away from flanges. Place the washers (key 22) and hex nuts (key 23) on the long cap screws and evenly tighten. Using proper bolting techniques, install remaining small cap screws (key 21), washers and hex nuts. See Torque Specification table for proper torque.
14. Place travel indicator assembly in the upper actuator casing (key 11), if present and tighten the travel indicator fitting (key 56).



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□ APPLY LUBRICANT (L) OR SEALANT (S)<sup>(1)</sup>  
 L1 = LITHIUM HYDROXYSTEGRATE NLGI 2 GRADE GREASE  
 S1 = ANAEROBIC METHACRYLATE SEALANT FOR NUTS AND BOLTS

1. Lubricant and sealant must be selected such that they meet the temperature requirements.

**Figure 6. Travel Indicator Assembly Drawings**

## Type EZL Travel Indicator Maintenance

A new and improved version of the travel indicator has been phased in during 2013. The new version improves the O-ring seal to minimize leakage and extend service life. The components of the legacy and new versions are not interchangeable. If maintenance is performed on the travel indicator, it is recommended to replace the entire travel indicator assembly with the new version. Part numbers for the assemblies are shown in the parts list. Figure 6 shows the difference between the designs. The spare parts kits will support either design. Take care to use the correct O-ring (key 12A or 12B) when performing maintenance, see parts list for the appropriate part number.

1. Remove plastic travel indicator cover (key 53).
2. Loosen travel indicator bushing (key 55) and remove it by sliding it over the travel indicator stem (key 54).
3. Remove indicator fitting (key 56) and inspect O-ring (key 70). Remove O-ring (key 12B) and back-up rings (key 76). Replace and lubricate O-ring if damaged. Pull up on the travel indicator stem (key 54) to force the spring collet (key 57) out of the diaphragm head groove. Examine these parts and the stem for wear and replace if necessary.

4. Insert the travel indicator stem (key 54) and spring collet (key 57) back into the diaphragm head groove. Replace the indicator fitting (key 56) and O-ring (key 70) and tighten with a referenced torque of 3.7 ft-lbs / 5 N·m.
5. Lubricate the O-ring (key 12B) and backup rings (key 76, 2 required). Place one back-up ring on the stem (key 54) followed by the O-ring and then the other back-up ring. Push into groove of the indicator fitting (key 56).
6. Slide the travel indicator bushing (key 55) over the travel indicator stem (key 54) and tighten firmly in place.
7. Replace the travel indicator cover (key 53) and tighten firmly in place.

## Pilot Maintenance

### Types 6352 through 6354M Pilots

Perform this procedure if changing the control spring for one of a different range or if inspecting, cleaning or replacing any other pilot parts. Pilot part key numbers are referenced in Figure 8.

## Note

**The body (key 1) may remain on the pipe nipple (key 21, Figure 8 or key 24, Figure 9) unless the entire pilot is replaced.**

1. To gain access to the diaphragm assembly (key 5), diaphragm limiter (key 23) if used, control spring (key 6), restriction (key 22), stem guide (key 8) or spring seat (key 7), remove the closing cap (key 11), loosen the locknut (key 10) and turn the adjusting screw (key 9) counter clockwise until compression is removed from the spring. Remove the machine screws (key 14) and separate the body from the spring case (key 2).
2. Inspect the removed parts and replace as necessary. Make sure the restriction and the registration hole in the body are free from debris. After assembly, make sure of the proper control spring setting according to the Startup section and re-mark the spring case if necessary.
3. To replace the valve plug (key 4) or bellows O-ring (key 17), remove the body plug (key 3) and body plug gasket (key 12). Be careful to keep the bellows assembly (key 16) from falling out and possibly getting lost while removing the valve plug. Inspect the removed parts and replace as necessary. Make sure the valve plug seating surfaces are free from debris.

## 61 Series Pilot

Perform this procedure if changing the control spring for one of a different range or if inspecting, cleaning or replacing relief valve or any other pilot parts. Pilot part key numbers are referenced in Figure 9.

1. Remove the pilot from the pipe nipple (key 24) unless just the control spring is to be changed.
2. To gain access to the control spring or other internal parts, remove the closing cap assembly (key 5) and relieve control spring (key 7) compression by turning the adjusting screw (key 6) counter clockwise. Change the control spring and install the adjusting screw and closing cap assembly if no other maintenance will be performed. Make sure of the proper control spring setting according to the Installation and Startup section and restamp the nameplate if necessary.
3. For any other internal maintenance, relieve control spring compression according to step 2. Then
  - remove the cap screws (key 20) and separate the pilot into three sections; spring case (key 1), body (key 2) and bottom cover (key 3).
4. To inspect the two diaphragms (keys 14 and 15) thoroughly, remove the diaphragm nut (key 11), hex nut (key 19) and the upper and lower relay heads (keys 16 and 17). The projecting prong in the body may be used as the restraining member to keep the yoke from turning while removing the nuts. Also inspect the O-ring (key 12) and replace any parts as necessary.
5. Take the yoke (key 4) and attached parts out of the body to examine the disk holder assembly (key 9). Remove the relay orifice (key 8) to check for clogging and replace if necessary.
6. To replace the disk holder assembly, first unscrew the bleed orifice (key 10). Remove it and the associated parts. Then unscrew the disk holder assembly from the bleed valve (key 26) to gain access to the relay spring (key 13). Clean or replace any parts as necessary before reassembling.
7. Upon reassembly, pay particular attention to the following assembly suggestions.
  - a. Before replacing the diaphragm case or spring case, be sure the yoke assembly is positioned so that it will not bind or rub on the prong in the relay body.
  - b. Avoid wrinkling the diaphragms when replacing the diaphragm case and spring case.
  - c. Replace the diaphragm case, carefully working the upper relay diaphragm (key 14) into the recess in the diaphragm case. If the diaphragm case rocks with respect to the pilot body, diaphragm is probably wrinkled.
  - d. Replace the spring case, using care to smooth the lower relay diaphragm (key 15) evenly into the recess in the pilot body.
  - e. Install the eight cap screws, tightening them down evenly in a crisscross pattern to avoid crushing the diaphragm. Recommended final torque on these cap screws is 10 to 12 ft-lbs / 14 to 16 N•m.
8. After assembly, make sure of the proper control spring setting according to the Installation and Startup section and restamp the nameplate (key 27) if needed.

# Type EZL

## Types 161M and 161EBM Pilots

Key numbers are referenced in Figure 10 unless otherwise noted.

### Trim Parts

1. As shown in Figure 10, remove the body plug (key 3). Use needle nose pliers to remove the plug spring (key 6) and plug/stem assembly (key 4).
2. Inspect the removed parts and body plug O-ring (key 15), replace as necessary and make sure the plug seating surfaces are free from debris.
3. Sparingly apply lubricant to the body plug O-ring (key 15) and the threads of the body plug (key 3). Install the body plug O-ring over the body plug.
4. As shown in Figure 10, stack the plug spring (key 6) and plug/stem assembly (key 4) on the body plug (key 3). Install the body plug with stacked parts into the body (key 1).

### Diaphragm Parts

1. Remove the closing cap (key 16), loosen the locknut (key 12) and back out the adjusting screw (key 11) until compression is removed from the control spring (key 9).
2. Remove the machine screws (key 13) and separate the spring case (key 2) from the body assembly (key 1). Remove the control spring seat (key 8), the control spring (key 9) and, if used, the diaphragm limiter (key 10).
3. Remove the diaphragm assembly (key 7) and inspect the diaphragm.
4. To gain access to the stem guide seal O-ring, remove and inspect the stem guide seal assembly (key 19) and if damaged replace the complete assembly. Inspect the outer O-ring (key 22), replace if necessary.
5. Install the diaphragm assembly (key 7) and push down on it to see if the plug/stem assembly (key 4) strokes smoothly and approximately 1/16 in. / 1.6 mm.

### Note

**In step 6, if installing a control spring with a different range, be sure to replace the spring range indicated on the spring case with the new spring range. A diaphragm limiter (key 10) and other listed parts are required with the highest spring range.**

6. As shown in Figure 10, stack the control spring (key 9), the control spring seat (key 8) and, if used, the diaphragm limiter (key 10) onto the diaphragm assembly (key 7). Make sure that, if used, the diaphragm limiter is installed bevelled side up. Sparingly apply lubricant to the control spring seat.
7. Install the spring case (key 2) on the body (key 1) with the vent (key 18) oriented to allow for wrenches, needed for connecting outlet piping and to prevent clogging or entrance of moisture. Install the machine screws (key 13) and, using a crisscross pattern, torque them to 5 to 7 ft-lbs / 6.8 to 9.5 N•m for Stainless steel constructions and 2 to 3 ft-lbs / 2.7 to 4.1 N•m for aluminum constructions.

### Note

**Spring case vent may be mounted in any orientation convenient to your application, but plastic vent (key 18) should be oriented downward.**

8. When all maintenance is complete, refer to the Startup and Adjustment section to put the regulator back into operation and adjust the pressure setting. Tighten the locknut (key 12), replace the closing cap gasket (key 17) if necessary and install the closing cap (key 16).

## Parts Ordering

Each Type EZL regulator is assigned a serial number, which can be found on the nameplate. Refer to the number when contacting your local Sales Office for technical information or ordering parts. Also be sure to include the complete 11-character part number from the following Parts List.

## Parts List

### Type EZL Main Valve (Figure 7)

Key	Description	Part Number
Seat Parts Kits		
2 and 3 in. / DN 50 and 80 (includes key numbers: 29, 30 and 34)		
4 in. / DN 100 (includes key numbers: 29, 30, 34 and 75)		
2 in. / DN 50, Nitrile (NBR) and Fluorocarbon (FKM)		REZL2X00N12
2 in. / DN 50, Fluorocarbon (FKM)		REZL2X00F12
3 in. / DN 80, Nitrile (NBR) and Fluorocarbon (FKM)		REZL3X00N12
3 in. / DN 80, Fluorocarbon (FKM)		REZL3X00F12
4 in. / DN 100, Nitrile (NBR) and Fluorocarbon (FKM)		REZL4X00N12
4 in. / DN 100, Fluorocarbon (FKM)		REZL4X00F12

## Type EZL Main Valve (Figure 7) (continued)

Key	Description	Part Number
	Seat and Diaphragm Parts Kits	
	2 and 3 in. / DN 50 and 80 (includes key numbers: 4, 7, 8, 9, 12B, 15, 17, 20, 28, 29, 30, 34, 70 and 76)	
	4 in. / DN 100 (includes key numbers: 4, 7, 8, 9, 12B, 15, 17, 20, 28, 29, 30, 34, 70, 75 and 76)	
	2 in. / DN 50, Nitrile (NBR) and Fluorocarbon (FKM)	REZL2X00N22
	2 in. / DN 50, Fluorocarbon (FKM)	REZL2X00F22
	3 in. / DN 80, Nitrile (NBR) and Fluorocarbon (FKM)	REZL3X00N22
	3 in. / DN 80, Fluorocarbon (FKM)	REZL3X00F22
	4 in. / DN 100, Nitrile (NBR) and Fluorocarbon (FKM)	REZL4X00N22
	4 in. / DN 100, Fluorocarbon (FKM)	REZL4X00F22
	Travel Indicator Parts Kits	
	2 in. / DN 50 (includes key numbers: 12B, 53, 54, 55, 56, 57, 58, 70 and 76)	ERSA01550A0
	3 and 4 in. / DN 80 and 100 (includes key numbers: 12B, 53, 54, 55, 56, 57, 58, 70 and 76)	ERSA01555A0
1	Body	
	2 in. / DN 50	
	Cast Iron	
	NPT	GE10583X012
	CL125 FF	GE10585X012
	CL250 RF	GE10587X012
	Steel	
	NPT	GE10588X012
	CL150 RF	
	Standard	GE10676X032
	Tapped inlet and outlet	14B5834X032
	CL300 RF	
	Standard	GE10676X012
	Tapped inlet and outlet	14B5834X042
	CL600 RF	
	Standard	GE10679X012
	Tapped inlet and outlet	14B5834X052
	BWE, Schedule 40	GE10680X012
	BWE, Schedule 80	GE10681X012
	SWE	GE10682X012
	3 in. / DN 80	
	Cast Iron	
	CL125 FF	GE10689X012
	CL250 RF	GE10698X012
	Steel	
	CL150 RF	
	Standard	GE10699X012
	Tapped inlet and outlet	14B5835X032
	CL300 RF	
	Standard	GE10700X012
	Tapped inlet and outlet	14B5835X042
	CL600 RF	
	Standard	GE10701X012
	Tapped inlet and outlet	14B5835X052
	BWE, Schedule 40	GE10702X012
	BWE, Schedule 80	GE10703X012
	4 in. / DN 100	
	Cast Iron	
	CL125 FF	GE10707X012
	CL250 RF	GE10822X012
	Steel	
	CL150 RF	
	Standard	GE10835X012
	Tapped inlet and outlet	14B5836X032

Key	Description	Part Number
1	Body (continued)	
	4 in. / DN 100 (continued)	
	Steel (continued)	
	CL300 RF	
	Standard	GE10839X012
	Tapped inlet and outlet	14B5836X042
	CL600 RF	
	Standard	GE10842X012
	Tapped inlet and outlet	14B5836X052
	BWE, Schedule 40	GE10843X012
	BWE, Schedule 80	GE10844X012
2	Seat Ring	
	2 in. / DN 50	GE10271X012
	3 in. / DN 80	GE11213X012
	4 in. / DN 100	GE17779X012
3*	Pin	
	2 in. / DN 50 (6 required)	M0295820X12
	3 and 4 in. / DN 80 and 100 (8 required)	M0297310X12
4*	Anti-Friction Ring (2 required)	
	2 in. / DN 50	M0272760X12
	3 and 4 in. / DN 80 and 100	M0272810X12
5	Actuator Lower Casing	
	2 in. / DN 50	GE05003X012
	3 and 4 in. / DN 80 and 100	GE07988X012
6	Cap Screws (8 required)	
	2 in. / DN 50	1A340924052
	3 and 4 in. / DN 80 and 100	GE11387X012
7*	O-ring	
	2 in. / DN 50	
	Nitrile (NBR)	12A1297X022
	Fluorocarbon (FKM)	12A1297X012
	3 in. / DN 80	
	Nitrile (NBR)	18B8514X012
	Fluorocarbon (FKM)	18B8514X022
	4 in. / DN 100	
	Nitrile (NBR)	18B2140X012
	Fluorocarbon (FKM)	18B2140X022
8*	Anti-Friction Rings (4 required)	
	2 in. / DN 50	M0194690X12
	3 and 4 in. / DN 80 and 100	M0192170X12
9*	O-ring (2 required)	
	2 in. / DN 50	
	Nitrile (NBR), -20 to 180°F / -29 to 82°C	1C3342X0042
	Fluorocarbon (FKM)	M6020036X12
	3 and 4 in. / DN 80 and 100	
	Nitrile (NBR), -20 to 180°F / -29 to 82°C	1D2658X0012
	Fluorocarbon (FKM)	1D2658X0022
10	Pipe Plug (up to 3 required), All sizes	1A767524662
11	Actuator Upper Casing	
	2 in. / DN 50	GE04968X012
	3 and 4 in. / DN 80 and 100	GE07514X012
12A*	O-ring	
	Nitrile (NBR)	M6010001X12
	Fluorocarbon (FKM)	M6020066X12
12B*	O-ring	
	Nitrile (NBR)	1H2926X0032
	Fluorocarbon (FKM)	1H2926X0022
13	Spring	
	2 in. / DN 50	M0195000X12
	3 and 4 in. / DN 80 and 100	M0196880X12
14	Sleeve	
	2 in. / DN 50	M0272600X12
	3 and 4 in. / DN 80 and 100	M0276310X12
15*	O-ring	
	2 in. / DN 50	M6020095X12
	3 and 4 in. / DN 80 and 100	M6020073X12
16	Socket Head Cap Screw (6 required)	
	2 in. / DN 50	M5011119X12
	3 and 4 in. / DN 80 and 100	M5011140X12

\*Recommended spare part

- continued -

# Type EZL

## Type EZL Main Valve (Figure 7) (continued)

Key	Description	Part Number
17*	O-ring 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M6020096X12 M6020127X12
18	Inlet Plate 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M0300260X12 M0196800X12
19	Outlet Plate 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M0279180X12 M0276570X12
20*	Diaphragm 2 in. / DN 50 3 and 4 in. / DN 80 and 100	GE07400X012 GE09204X012
21	Cap Screw 2 in. / DN 50 (14 required) 3 and 4 in. / DN 80 and 100 (22 required)	18B3065X012 1A514724052
22	Plain Washer 2 in. / DN 50 (32 required) 3 and 4 in. / DN 80 and 100 (48 required)	1A5196X0012 1A518925072
23	Hex Nut 2 in. / DN 50 (16 required) 3 and 4 in. / DN 80 and 100 (24 required)	1E944624112 1A3412A0022
24	Continuous Thread Stud Bolt (4 required) 2 in. / DN 50 3 and 4 in. / DN 80 and 100	GE00808X012 M4693003X12
25	Intermediate Flange 2 in. / DN 50 3 in. / DN 80 4 in. / DN 100	GE10308X012 GE11210X012 GE17777X012
26	Hex Nut (4 required) 2 in. / DN 50 3 and 4 in. / DN 80 and 100	1A341224122 1A368124122
27	Sleeve Adaptor 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M0272570X12 GD27634X012
28*	O-ring 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M6020079X12 M6020151X12
29*	O-ring 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M6020112X12 M6020005X12
30*	Disk Holder Assembly 2 in. / DN 50 Nitrile (NBR) Fluorocarbon (FKM) 3 and 4 in. / DN 80 and 100 Nitrile (NBR) Fluorocarbon (FKM)	M0279110X12 M0281870X12 M0276830X12 M0282120X12
31	Disk Retainer 2 in. / DN 50 100% Capacity 80% Capacity 50% Capacity 30% Capacity 3 and 4 in. / DN 80 and 100 100% Capacity 80% Capacity 50% Capacity 30% Capacity	M0272750X12 M0297340X12 M0297430X12 M0297440X12 M0276250X12 M0297630X12 M0297640X12 M0297650X12
32	Lock Washer (2 required) 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M5077004X12 M5077001X12
33	Socket Head Cap Screw (2 required) 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M5011006X12 M5011017X12

\*Recommended spare part

Key	Description	Part Number
34*	O-ring (2 required) 2 in. / DN 50 Nitrile (NBR) Fluorocarbon (FKM) 3 and 4 in. / DN 80 and 100 Nitrile (NBR) Fluorocarbon (FKM)	10B4428X012 10B4428X022 10B4366X012 10B4366X022
35	Bracket (2 required) 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M0278570X12 M0220960X12
36	Nameplate	-----
37	Drive Screw (5 required), All sizes	1A368228982
38	Travel Indicator Plug, All sizes	M0297680X12
39	Bolt (2 required) 2 in. / DN 50 3 and 4 in. / DN 80 and 100	GE07223X012 GE07221X012
43	Caution Label (2 required)	GE00835X012
44	Adjusting Screw Cap, All sizes	24B1301X012
53	Indicator Cover 2 in. / DN 50 3 and 4 in. / DN 80 and 100	M0196770X12 M0192220X12
54	Travel Indicator Stem 2 in. / DN 50 3 and 4 in. / DN 80 and 100	ERSA01799A0 ERSA01806A0
55	Indicator Bushing, All sizes	ERSA02798A0
56	Travel Indicator Fitting, All sizes	ERSA02569A0
57	Spring Collet, All sizes	M0192180X12
58	Travel Indicator Scale, All sizes	M0201990X12
59	Flow Arrow, All sizes	-----
60	Protective Cap 2 in. / DN 50 3 in. / DN 80	T13659T0112 T13659T0092
70*	O-ring	M6020005X12
72	Belleville Washer 2 in. / DN 50 3 and 4 in. / DN 80 and 100	GE10273X012 GE11214X012
75*	O-ring 4 in. / DN 100 Nitrile (NBR) Fluorocarbon (FKM)	10B4373X012 10B4373X022
76*	Back Up Ring (2 required)	1N659106242

## Mounting Parts

### Standard Single Pilot Configuration for Mounting Type 6352, 6353 or 6354

Key	Description	Part Number
47	Pipe Nipple	1C782526012
48	Tube Elbow Steel Stainless steel	----- -----
49	External Tube Connector Steel Stainless steel	----- -----
52	Tubing	-----
63	1/4 in. / 6.35 mm, Pipe Nipple	1C488226232
64	1/4 in. / 6.35 mm, Coupling	1C911728992

### Standard Working Monitor Pilot Types 161AYW and 61 Series

Key	Description	Part Number
65	Mounting Bracket	GE07740X012
66	Bushing (2 required)	1A3424X00A2
67	Washer (2 required)	1D716228982
68	Nut (2 required)	1E944024112
69	U-bolt	11B3469X012

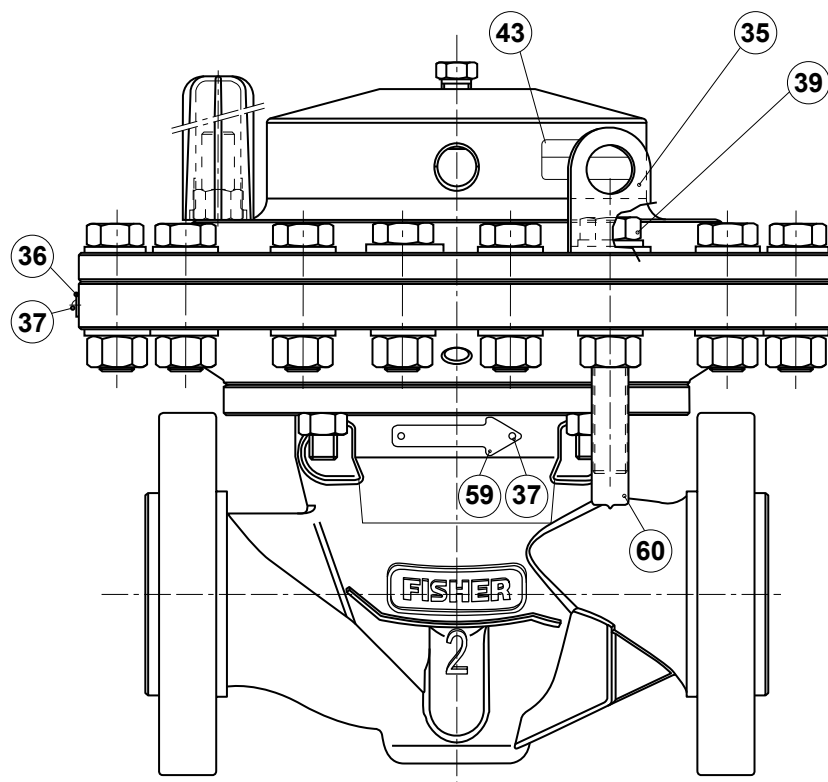


L1 = LITHIUM HYDROXYSTEGRATE NLGI 2 GRADE GREASE  
S1 = ANAEROBIC METHACRYLATE SEALANT FOR NUTS AND BOLTS  
S2 = ANAEROBIC METHACRYLATE SEALANT FOR THREADS  
S3 = MULTI-PURPOSE POLYTETRAFLUOROETHYLENE (PTFE) THREAD SEALANT

1. Lubricant and sealants must be selected such that they meet the temperature requirements.

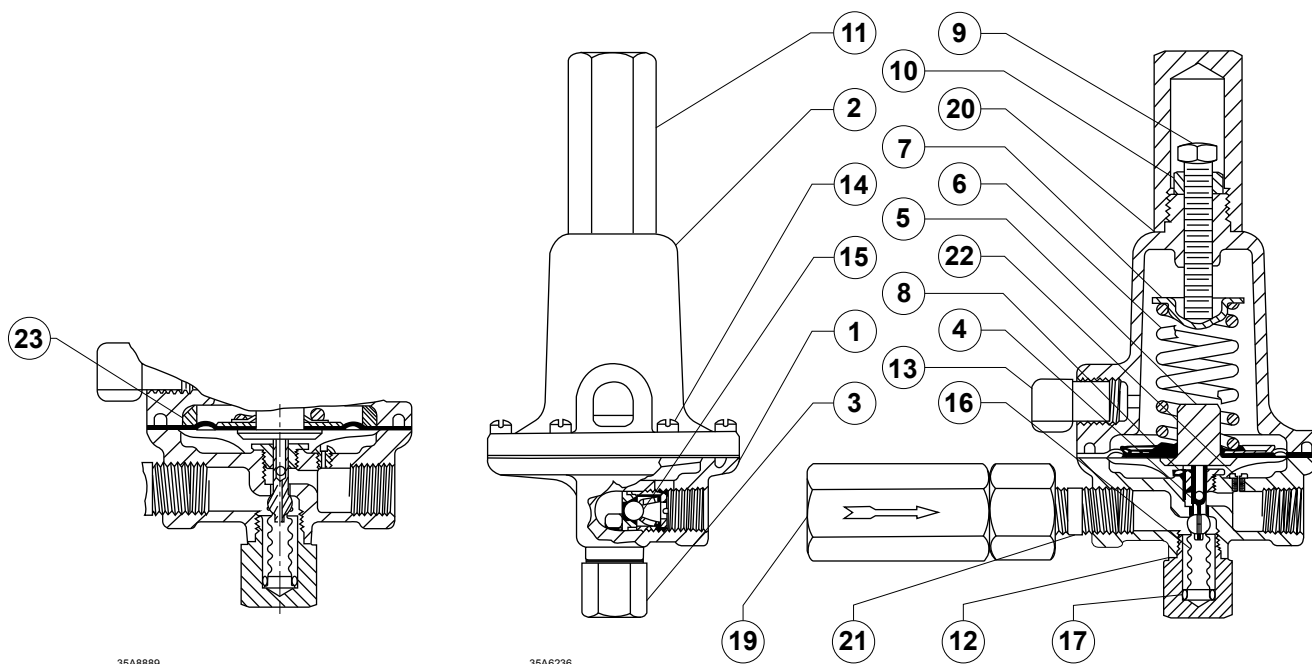
**DETAIL A.2**  
**2 AND 3 IN. / DN 50 AND 80**  
**BODY SIZES ONLY**

17



GE10987-8

Figure 7. Type EZL Main Valve Assembly (continued)



DETAIL OF TYPE 6354M OR 6354H PILOT

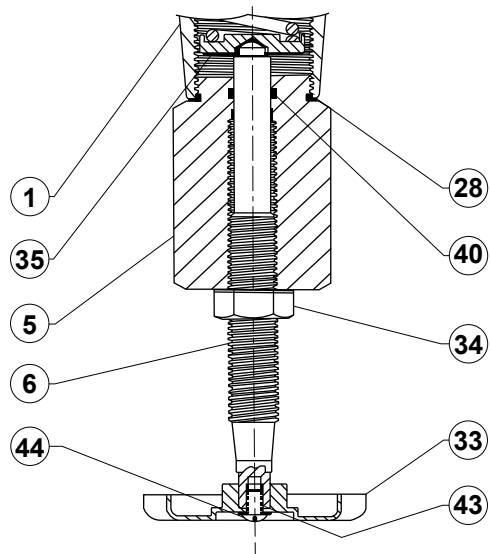
COMPLETE TYPE 6352, 6353 OR 6354L PILOT

Figure 8. Types 6352 through 6354H Pilot Assemblies

## Types 6352, 6353, 6354L, 6354M and 6354H Pilots (Figure 8)

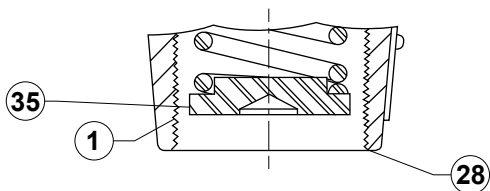
Key	Description	Part Number	Key	Description	Part Number
Parts kit (included are: valve plug, key 4; diaphragm assembly, key 5; body plug gasket, key 12; bellows O-ring, key 17; closing cap gasket, key 20 and for the P590 Series filter, filter element, key 2 and gasket, key 7)			8	Stem Guide 416 Stainless steel ( <b>standard</b> ) 410 Stainless steel (NACE)	15A6222X012 15A6222X022
Type 6352 R6352X00012 Type 6353 R6353X00012 Type 6354 R6354X00012			9	Adjusting Screw Type 6352 or 6353 Type 6354 For use with Type 662	10B7192X012 10B6190X012 18B3500X052
1	Pilot Body Aluminum Aluminum with 50 psig / 3.4 bar Type 1806H relief Stainless steel Stainless steel with 50 psig / 3.4 bar Type 1806H relief	35A6228X012  17A8075X012 39A5971X012  17A8075X022	10	Locknut Type 6352 Type 6353 or 6354	1C724018992 1A946324122
2	Spring Case Aluminum Stainless steel	25A6220X012 28A9277X012	11	Closing Cap Aluminum Stainless steel	23B9152X012 1H2369X0032
2	Regulator Bonnet (for Type 6353)	24B6641X022	12	Body Plug Gasket/O-ring For aluminum body, Composition For Stainless steel body, Nitrile (NBR) For Stainless steel body, Fluorocarbon (FKM)	1C495704022 1F113906992 1N463906382
3	Body Plug Aluminum 316 Stainless steel	15A6221X012 15A6221X042	13	Vent Assembly	Type Y602X1-A12
4	Valve Plug and Stem Assembly Nitrile (NBR) disk with Stainless steel stem ( <b>standard</b> ) Nitrile (NBR) disk with 316 Stainless steel stem (NACE) Fluorocarbon (FKM) with Stainless steel stem	15A6207X012 15A6207X052 15A6207X042	14	Machine Screw (6 required) Aluminum and brass Stainless steel	10B6189X022 1V4360X0022
5	Diaphragm Assembly Type 6352, Nitrile (NBR) Type 6353, Nitrile (NBR) Type 6353, Fluorocarbon (FKM) Type 6353, Fluorocarbon (FKM) Type 6354, Neoprene (CR) Type 6354, Fluorocarbon (FKM)	15A6216X012 15A6216X022 15A6216X092 15A6216X162 15A6216X032 15A6216X152	15	Relief Valve Assembly 25 psig / 1.7 bar 25 psig / 1.7 bar (NACE) 25 psig / 1.7 bar (for oxygen service) 25 psig / 1.7 bar (Stainless steel)	16A5929X052 16A5929X042 16A5929X032 16A5929X072
6	Control Spring Type 6352 2 in. w.c. to 2 psig / 5 to 140 mbar 2 to 10 psig / 0.14 to 0.69 bar, Black DVGW 4 to 10 psig / 0.30 to 0.69 bar Type 6353 3 to 40 psig / 0.21 to 2.8 bar 35 to 125 psig / 2.4 to 8.6 bar DVGW 10 to 40 psig / 0.69 to 2.8 bar DVGW 40 to 58 psig / 2.8 to 4.0 bar Type 6354L 85 to 200 psig / 5.9 to 13.8 bar Type 6354M 175 to 220 psig / 12.1 to 15.2 bar Type 6354H 200 to 300 psig 13.8 to 20.7 bar	14A9672X012 14A9673X012 14A9673X012  1E392527022 1K748527202 1E392527022 1K748527022  1L346127142  1L346127142  15A9258X012	16	Bellows Assembly	15A6202X032
7	Spring Seat Type 6352 or 6353 Type 6354L, 6354M or 6354H	1B798525062 1K155828982	17	O-ring	1D682506992
			19	Filter P590 Series ( <b>standard</b> ) P590 Series for corrosive service P590 Series for NACE service	Type P590X1-A2 Type P590X1-A1 Type P590X1-A6
			20	Closing Cap Gasket	15A6218X012
			21	Pipe Nipple For standard and corrosive service For NACE service For corrosive NACE service	1C488226232 1C4882X0032 1C488238982
			22	Restriction Standard High	17A2030X012 17A2029X012
			23	Diaphragm Limiter Aluminum Brass Stainless steel	15A9259X012 19A8674X012 10B4407X012
			26	NACE Tag	-----
			27	Tag Wire	-----
			28	Packing Bonnet	1L449635072
			29	Packing Nut	0P077624102
			30	Handwheel	1L217544992
			31	Washer	1A329128982
			32	Screw	1E985428982
			33	Packing Spring	1F125437012
			34	Packing Box Gasket	1B487099202
			35	Packing Follower	1K885035072
			36	External Adaptor	1F124801012
			37	Internal Adaptor	1F124401012
			38	Packing Washer	1F125236042
			39	Packing Ring (3 required)	1C752601012
			40	Adjusting Screw	21B5621X012

# Type EZL



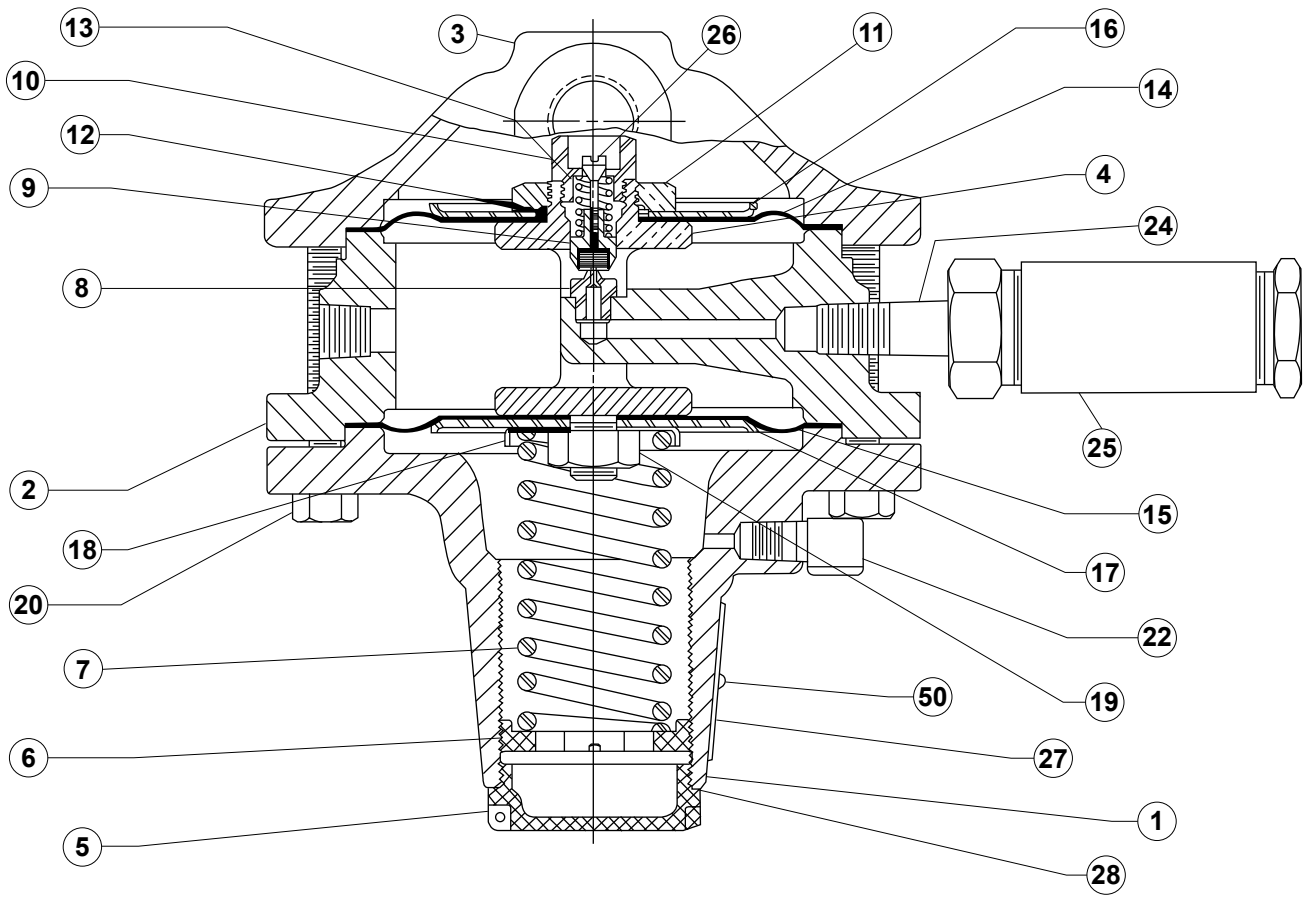
30A6327

DETAIL OF HANDWHEEL OPTION



20A6328

DETAIL OF CAPPED  
ADJUSTING SCREW OPTION



20A6326

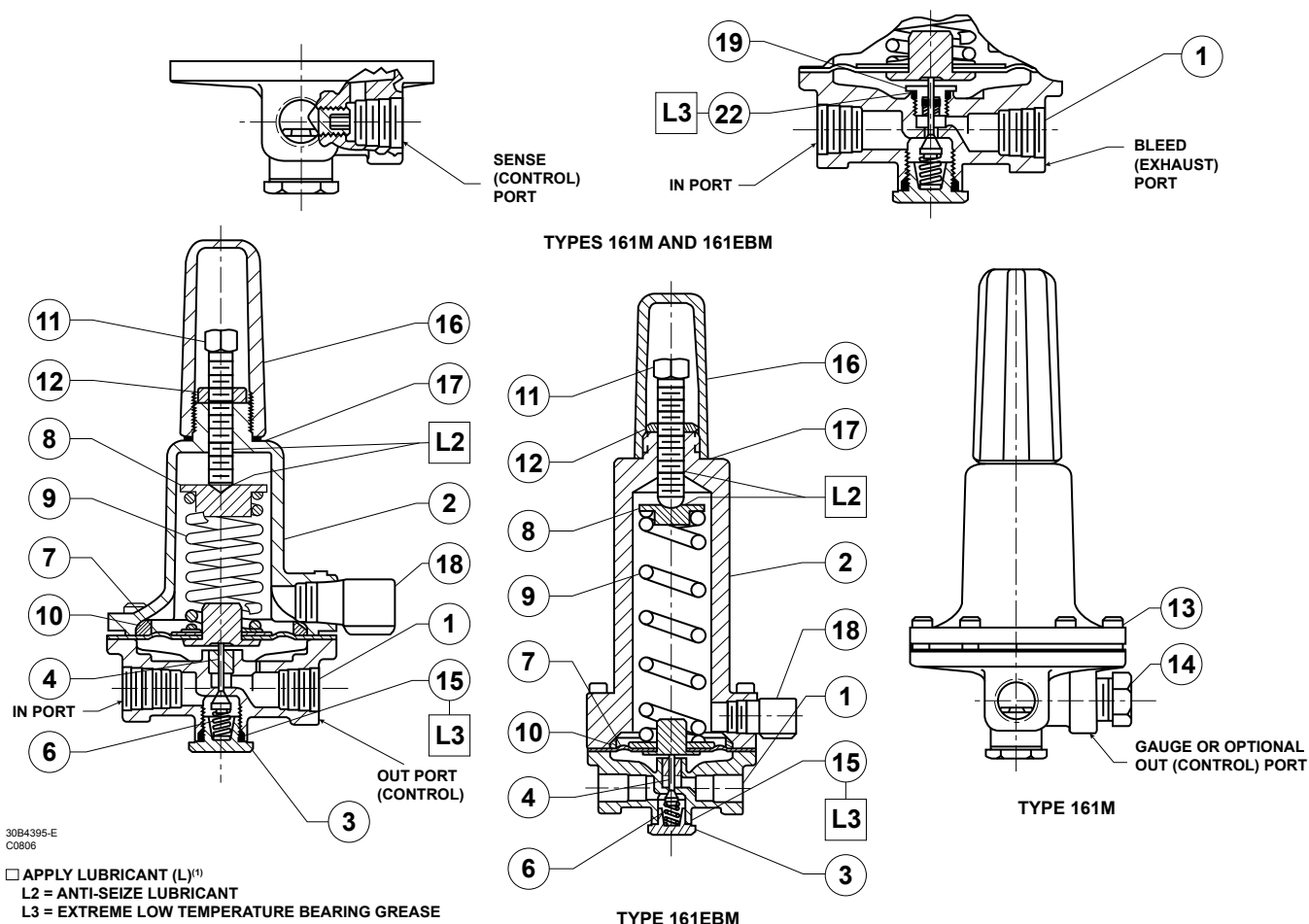
TYPE 61L PILOT

Figure 9. Type 61L Pilot Assembly

## 61 Series Pilots (Figure 9)

Key	Description	Part Number	Key	Description	Part Number
1	Relay Spring Case		12	O-ring Seal	
	Types 61L, 61LD and 61LE	1B983919012		Standard and corrosive trim	1B885506992
	Type 61H			Pressure loaded corrosive trim	1B8855X0012
	Standard adjusting screw	1B984119012	13	Relay Spring	
	Capped adjusting screw or Type 662	1H232619012		Type 61L	1C911537022
	Type 61HP			Type 61HP	18797937022
	Standard adjusting screw	2P969419012	14	Upper Relay Diaphragm	
	Capped adjusting screw	20A4735X012		Type 61L	
2	Relay Valve Body			Standard and corrosive trim	1B885202052
	Types 61L, 61LD, 61LE and 61H	2J581919012		Pressure loaded corrosive trim	1N162802332
	Type 61HP	33A9845X012		Type 61HP	13A9841X022
3	Bottom Cover		15	Lower Relay Diaphragm	
	Type 61L	2C518619012		Type 61L	
	Type 61HP	13A9843X012		Standard and corrosive trim	1B886002052
4	Relay Yoke			Pressure loaded corrosive trim	1N536102332
	Type 61L	1D662544012		Type 61HP	13A9840X012
	Type 61HP (2 required)	13A9838X012	16	Upper Relay Head	
5	Closing Cap Assembly			Type 61L	1B919325072
	Type 61L			Type 61HP (4 required)	13A9839X012
	For all except pilots with handwheel adjusting screw and pressure loaded pilots	T11069X0012	17	Lower Relay Head (Type 61L only)	1B91942S072
	Pressure loaded corrosive trim	1E422724092	18	Spring Seat (Type 61L only)	1B886225072
	Standard trim with handwheel adjusting screw	1R759314012	19	Hex Nut	
	Type 61HP			Type 61L	1A340324122
	Pressure loaded/capped adjusting screw	1E599914012		Type 61HP (2 required)	1A346524122
6	Adjusting Screw		20	Cap Screw (8 required)	1B989624052
	Type 61L		23	Pipe Plug (for Type 61L)	1A649528992
	For all except handwheel adjusting screw	1B537944012	24	Pipe Nipple	1C488226232
	For use with handwheel adjusting screw	1R759414012	25	Filter Assembly	
	Type 61HP			Standard trim	Type P590X1-A2
	Standard	1C216032992		Corrosive trim	Type P590X1-A1
	Pressure loaded/capped adjusting screw	1F6635X0012	26	Bleed Valve	
7	Control Spring			Type 61L	1D986735132
	Type 61L			Type 61HP	1D5604000B2
	0.25 to 2 psig / 0.02 to 0.14 bar	1B886327022	27	Nameplate	-----
	1 to 5 psig / 0.07 to 0.34 bar	1J857827022	28	Gasket (Type 61L only)	1P753306992
	2 to 10 psig / 0.14 to 0.69 bar	1B886427022	30	Pipe Plug	1A369224492
	5 to 15 psig / 0.34 to 1.0 bar	1J857927142	33	Handwheel	1J496144012
	10 to 20 psig / 0.69 to 1.4 bar	1B886527022	34	Hex Nut	1A351124122
	Type 61HP		35	Spring Seat	
	15 to 45 psig / 1.0 to 3.1 bar	1E392527022		Type 61L	1J618124092
	35 to 100 psig / 2.4 to 6.9 bar	1D387227022		Type 61HP	10A3963X012
	100 to 300 psig / 6.9 to 20.7 bar	1D465127142	40	O-ring	1D541506992
8	Relay Orifice		41	Adaptor	1J881624092
	Standard applications	1C520135032	42	Yoke Cap	13A9836X012
	Fast close and open or open only	1D373735032	43	Lockwasher	1A352332992
9	Disk Holder Assembly		44	Machine Screw	16A5763X012
	Standard trim	1B8868000A2	45	Valve Spring Seat	1L251135072
	Corrosive trim	1B8868000B2	46	Cap Screw (6 required)	15A0690X012
10	Bleed Orifice		47	Machine Screw (4 required)	1A866935032
	Type 61L		48	Cap Screw (6 required)	1P327028982
	Standard bleed	1B887335032	50	Drive Screw (2 required)	1A368228982
	Capped bleed	1D777135032	51	Diaphragm Insert (2 required)	13A9842X012
	Type 61HP	1D318135032	52	Lower Yoke Cap	13A9837X012
11	Diaphragm Nut		53	Bleed Plug	1V211514012
	Standard trim	1B989514012	54	Vent Assembly	Type Y602X1-A12
	Corrosive trim	1B989535072			

# Type EZL



**Figure 10. Types 161M and 161EBM Pilot Assemblies**

**Table 4. 161M Series Monitor Pilot Part Numbers (keys 7, 8, 9, 10 and 11, Figure 10)**

KEY	PART NAME	CONTROL SPRING RANGE IN psig / bar AND SPRING COLOR CODE		
		5 to 15 / 0.34 to 1.0, Yellow	10 to 125 / 0.69 to 8.6, Red	120 to 300 / 8.3 to 20.7, Green
7	Diaphragm Assembly	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X032 <sup>(2)</sup>
8	Spring Seat	1B798525062	1B798525062	1K155828982
9	Spring	1E392527022	1K748527202	15A9258X012
10	Diaphragm Limiter	-----	10B4407X012	-----
11	Adjusting Screw	10B6190X012	10B7192X012	10B6190X012

1. Standard assembly for Stainless steel construction; 1/32 in. / 0.80 mm thick diaphragm and 1-3/4 in. / 45 mm diaphragm plate diameter.  
2. Standard assembly for Stainless steel construction; 1/32 in. / 0.80 mm thick diaphragm and 1-1/2 in. / 38 mm diaphragm plate diameter.

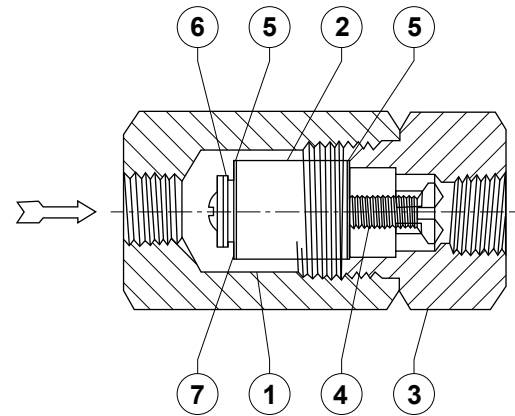
**Table 5. 161EBM Series Monitor Pilot Part Numbers (keys 7, 8, 9, 10 and 11, Figure 10)**

KEY	PART NAME	CONTROL SPRING RANGE IN psig / bar AND SPRING COLOR CODE					
		5 to 15 / 0.34 to 1.0, White	10 to 40 / 0.69 to 2.8, Yellow	30 to 75 / 2.1 to 5.2, Black	70 to 140 / 4.8 to 9.7, Green	130 to 200 / 9.0 to 13.8, Blue	200 to 350 / 13.8 to 24.1, Red
7	Diaphragm Assembly	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X032 <sup>(2)</sup>
8	Spring Seat	17B0515X012	17B0515X012	17B0515X012	17B0515X012	17B0515X012	17B0515X012
9	Spring	17B1260X012	17B1262X012	17B1259X012	17B1261X012	17B1263X012	17B1264X012
10	Diaphragm Limiter	-----	-----	-----	-----	-----	10B4407X012
11	Adjusting Screw	10B3081X012	10B3081X012	10B3081X012	10B3081X012	10B3081X012	10B3080X012

1. Standard assembly for Stainless steel construction; 1/32 in. / 0.80 mm thick diaphragm and 1-3/4 in. / 45 mm diaphragm plate diameter.  
2. Standard assembly for Stainless steel construction; 1/32 in. / 0.80 mm thick diaphragm and 1-1/2 in. / 38 mm diaphragm plate diameter.

## Types 161M and 161EBM Pilots (Figure 10)

Key	Description	Part Number
	Type 161M Pilot Parts Kit (included are keys 4, 6, 7, 15, 17, 19 and 22)	
	For 5 to 15 or 10 to 125 psig / 0.34 to 1.0 or 0.69 to 8.6 bar control spring range	R161MX00012
	For 120 to 300 psig / 8.3 to 20.7 bar control spring range	R161MX00022
	For pressure loading with 5 to 15 or 10 to 125 psig / 0.34 to 1.0 or 0.69 to 8.6 bar control spring range	R161MX00032
1	Body Assembly, Stainless steel	30B8715X012
2	Spring Case	
	Type 161M, Stainless steel	28A9277X012
	Type 161EBM, Aluminum	34B9955X012
3	Body Plug, Stainless steel	1B7975X0052
4*	Plug/Stem Assembly,	
	Nitrile (NBR) with Stainless steel stem	20B9389X052
	Fluorocarbon (FKM) with Stainless steel stem	20B9389X062
6	Plug Spring, 302 Stainless steel	1E701337022
7*	Diaphragm Assembly, Nitrile (NBR) diaphragm with 304 Stainless steel diaphragm plate	
	Type 161M	See Table 4
	Type 161EBM	See Table 5
8	Control Spring Seat, Plated steel	
	Type 161M	See Table 4
	Type 161EBM	See Table 5
9	Control Spring, Plated steel spring wire	
	Type 161M	See Table 4
	Type 161EBM	See Table 5
10	Diaphragm Limiter, 303 Stainless steel	
	Type 161M	See Table 4
	Type 161EBM	See Table 5
11	Adjusting Screw, Plated steel	
	Type 161M	See Table 4
	Type 161EBM	See Table 5
12	Locknut, Plated steel	
	Type 161M	1A946335042
	Type 161EBM	17B1897X012
13	Machine Screw, Plated steel (6 required)	
	Type 161M, Stainless steel spring case	1D617032992
	Type 161EBM, Aluminum spring case	1A7641X0022
14	Pipe Plug	1A767535072
15*	Body Plug O-ring, Nitrile (NBR) rubber	1F113906992
16	Closing Cap	
	Nylon (PA)	T11069X0012
	Type 161M	23B9152X012
	Type 161EBM	24B1301X012
	Metal, for pressure loading	
	Type 161M	1H2369X0012
	Type 161EBM	17B1406X012
17*	Closing Cap Gasket, Pressure loading for metal closing cap only	
	Type 161M	15A6218X012
	Type 161EBM	1C659804022
18	Type Y602-12 Vent Assembly, Plastic	27A5516X012
19*	Stem Guide Seal Assembly, Stainless steel seal and seal retainer with Nitrile (NBR) rubber O-ring	
		10B8711X012
22*	O-ring (for Type 161M only)	10A0904X012



A7008

Figure 11. P590 Series Filter

## P590 Series Filter (Figure 11)

Key	Description	Part Number
1	Filter Body	
	Type P594-1, Brass	1E312414012
	Type P593-1, Aluminum	1E312409012
2*	Filter Element, Cellulose	1E312606992
3	Filter Head	
	Type P594-1, Brass	1E312514012
	Type P593-1, Aluminum	1E312509012
4	Machine Screw	
	Type P594-1, Brass	1J500218992
	Type P593-1, Aluminum	1J500209012
5	Washer (2 required)	
	Type P594-1, Brass	1J500018992
	Type P593-1, Aluminum	1J500010062
6	Spring Washer, Plated carbon steel	1H885128982
7*	Gasket, Composition	1F826804022

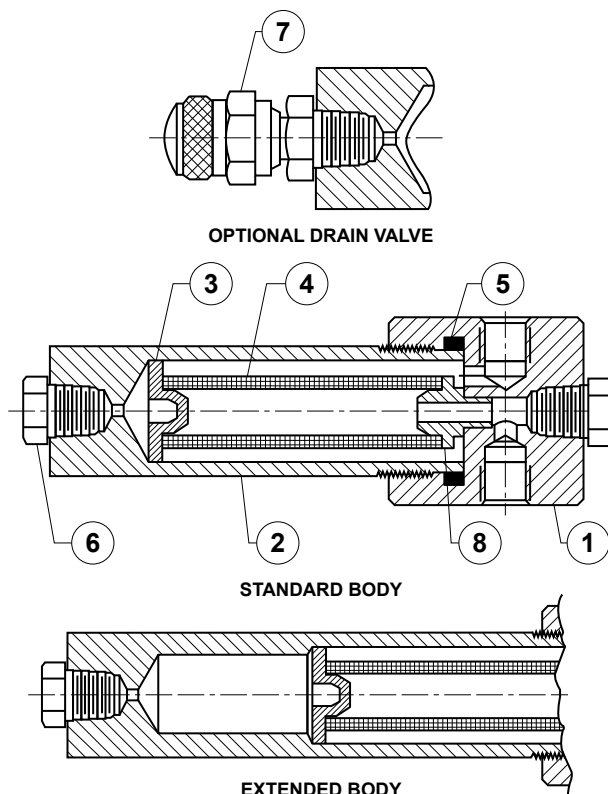
\*Recommended spare part

# Type EZL

## Type 252 Pilot Supply Filter (Figure 12)

Key	Description	Part Number
1	Filter Head Assembly Aluminum (A92011 T3) 316 Stainless steel	17B7978X012 17B7978X022
2	Filter Body Aluminum (A92011 T3) Standard Extended 316 Stainless steel Standard Extended	27B6811X022 27B7488X022  27B6811X012 27B7488X012
3	Lower Seat, Delrin®	17B6816X012
4	Filter Cartridge, Polyethylene	17B6813X012
5	O-ring, Nitrile (NBR)	1F269206992
6	Pipe Plug, 316 Stainless steel	1A767535072
7	Drain Valve (Optional), 316 Stainless steel	16A8280X362
8	Upper Seat, Delrin®	17B6814X012

Delrin® is a mark owned by E.I. du Pont De Nemours and Co.



A7013

Figure 12. Type 252 Filter

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